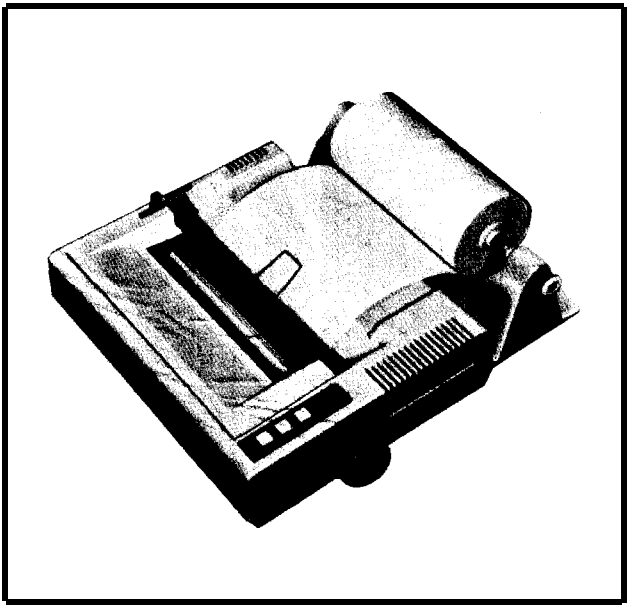
M X - 8 5

DOT MATRIX PRINTER

Operation Manual



P8290062-1

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The MX-85 Dot Matrix Printer is a highly versatile communication grade terminal printer, with the following features:

1. **Print Speed: 80 CPS**
2. **Microprocessor controlled, logic seeking, bidirectional printing**
3. **Interface: Serial - RS-232C and 20 to 80 mA Current Loop**
4. **Transmission Code: ASCII and Baudot - 45.5 to 9600 baud**
5. **Buffer size: 4K Bytes**
6. **High quality and reliability**
7. **High density print quality - 9x7 Matrix**
8. **Operator replaceable, low cost dot head with 100×10^6 character life**
9. **Operator replaceable ribbon cartridge with 3×10^6 character life - Black**
10. **Standard: Roll Paper Holder**
11. **Options:**
    - **(1) Roll Paper Rewind**
    - **(2) Tractor Feed**

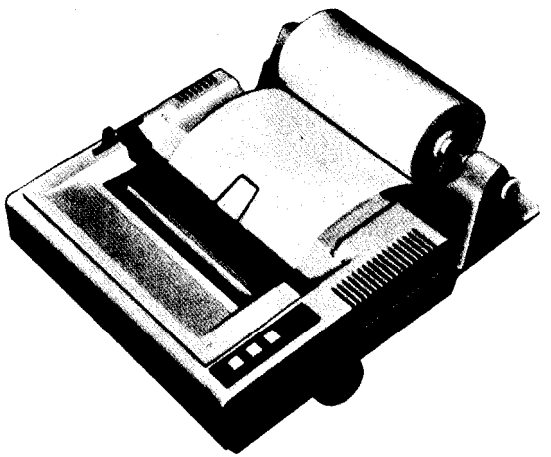


Fig. 1 MX-85 Dot Matrix Printer

INSTALLATION

1. Unpacking & Set-up of MX-85

Before removing the MX-85 from the carton, check the box for evidence of shipping damage. If such evidence is present, notify the carrier immediately.

1.1. Unpacking

(1) Open carton.
(2) Remove accessories; ribbon, manual, etc.
(3) Grasp the MX-85 by, its underside and lift straight out with 'packing material attached.
(4) Place the printer on a flat surface.
(5) Carefully remove packing material.
(6) Remove the vinyl cover.

1.2. Repacking

Perform in reverse order of above.

NOTE:

Be sure shipping screws and protective sheet for paper sensor are reinstalled. It is highly recommended that all original material be retained for use in reshipment of the MX-85.

1.3. Contents of carton

The Carton should contain the following:

1. MX-85 Printer
2. Cartridge Ribbon
3. Operation Manual
4. Roll Paper Holder
5. AC Power Cord
6. Filter Circuit Board

If there is any evidence of damage or missing items, contact the vendor from whom the printer was purchased to report the details.

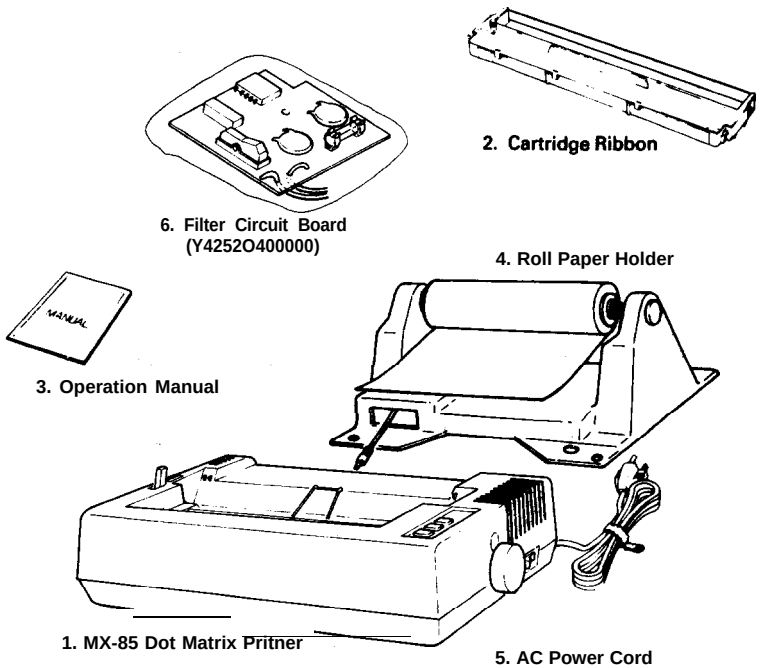


Fig. 2 Contents of Carton

1.4. Operation site

1. The MX-85 should be installed on a flat, firm surface with adequate room to the rear to accommodate the roll paper holder and paper rewind device if so equipped.
2. Care should be exercised in locating the MX-85 in areas where it will not be exposed to direct sunlight or where the environment contains grease or dust.
3. The MX-85 should not be located in the vicinity of noise generating equipment or heat generating equipment.
4. Do not subject the MX-85 to temperatures below 5°C (41°F) or above 35°C (95°F) during operation. Also avoid sudden changes in temperature and extreme shock.

1.5. Assembly

The following items will be necessary to complete the set-up of the MX-85 Printer.

1. Phillips #2 screwdriver
2. Flat blade screwdriver
3. Soldering iron (if jumper revision is necessary)

1.6. Opening the printer

With the Printer facing you, grasp the cover firmly on the left side with the right hand. While holding down the left side of the machine with the left hand, pull cover up. Reinstallation is accomplished by inserting the right side and pushing down on the left side of the cover.

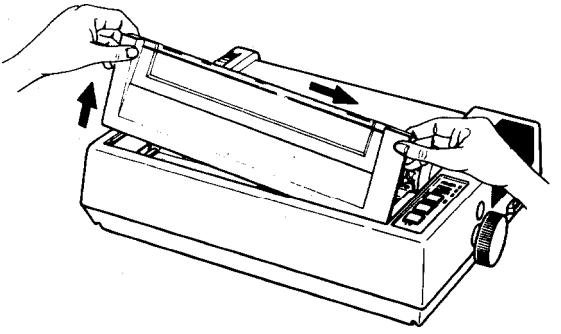


Fig. 3 Removal of Printer Cover

1.7. Removal of shipping screws

1. **Turn the MX-85 upside down, exercising care so the paper release lever is not bent.**
2. **Remove the two (2) shipping screws from the lower case.**

   NOTE:

   These shipping screws should be retained for use during reshipment of the MX-85. They are necessary to prevent damage to the print mechanism which may be **caused** *by shock or vibration during transportation.*

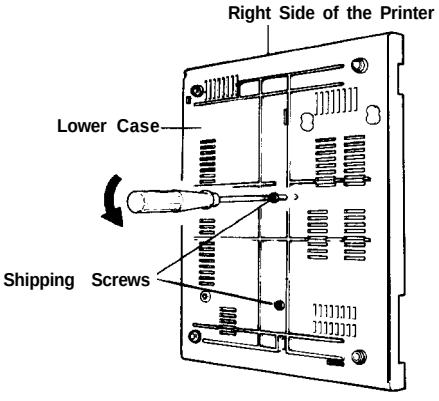


Fig. 4 Removal of Shipping Screws

1.8. Removal of the upper case

In order to check, or change, settings of the internal switches and jumpers, it is necessary to remove the upper case.

NOTE:

Before proceeding, be sure that the MX-85 is completely disconnected from external sources. Also, adequately discharge any static electricity which **may** *be present on your person to prevent damage to any electronic components.*

1. **Remove the black roller knob on the right side of the printer by pulling straight out, firmly and steadily.**
2. **Remove the printer cover, as directed previously, by pulling up on its left side.**

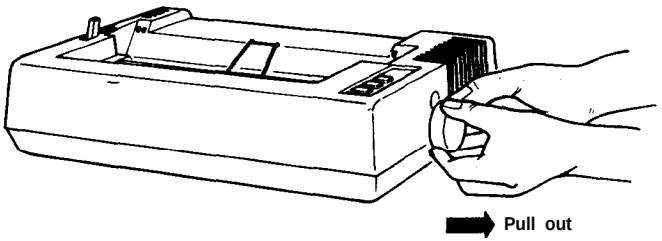


Fig. 5 Removing Manual Paper Feed Knob

3. **Turn the Printer upside down, observing caution with the paper roll release**
4. **Loosen the four (4) Phillips head screws located in the extreme corners of the bottom cover.**

   NOTE:

   Placing tape over the holes will prevent accidental loss of the screws when the Printer is inverted.
5. **Turn the Printer right side up. Carefully lift the upper case from the left side. When the case is partially raised, reach in and pull control panel cable loose. Set the cover safely aside.**

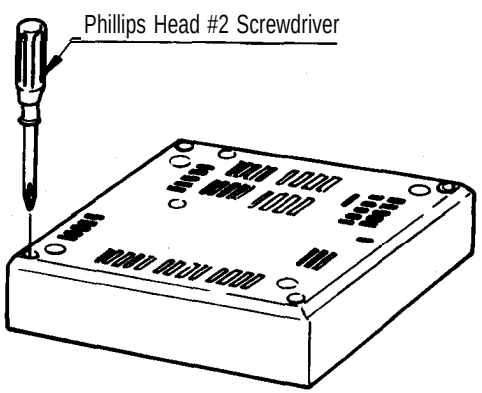


Fig. 6 Loosening All 4 Screws

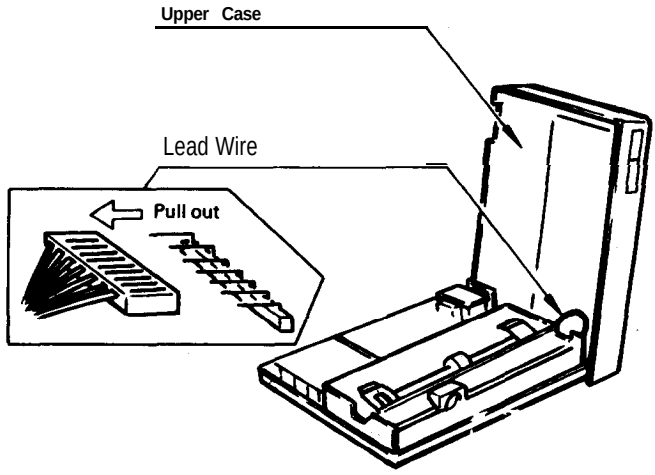


Fig. 7 Removing Wires Connected to Control Panel

2. Construction and Location of the MX-85 Components

At this time, the following main components of the MX-85 Printer and their respective locations can be observed:

1. **Transformer & Filter Circuit Board**
2. **SMDP Board - Top**
3. **SMCT Board - Bottom**
4. **Printer Mechanism - M-3310**
5. **Control Panel**

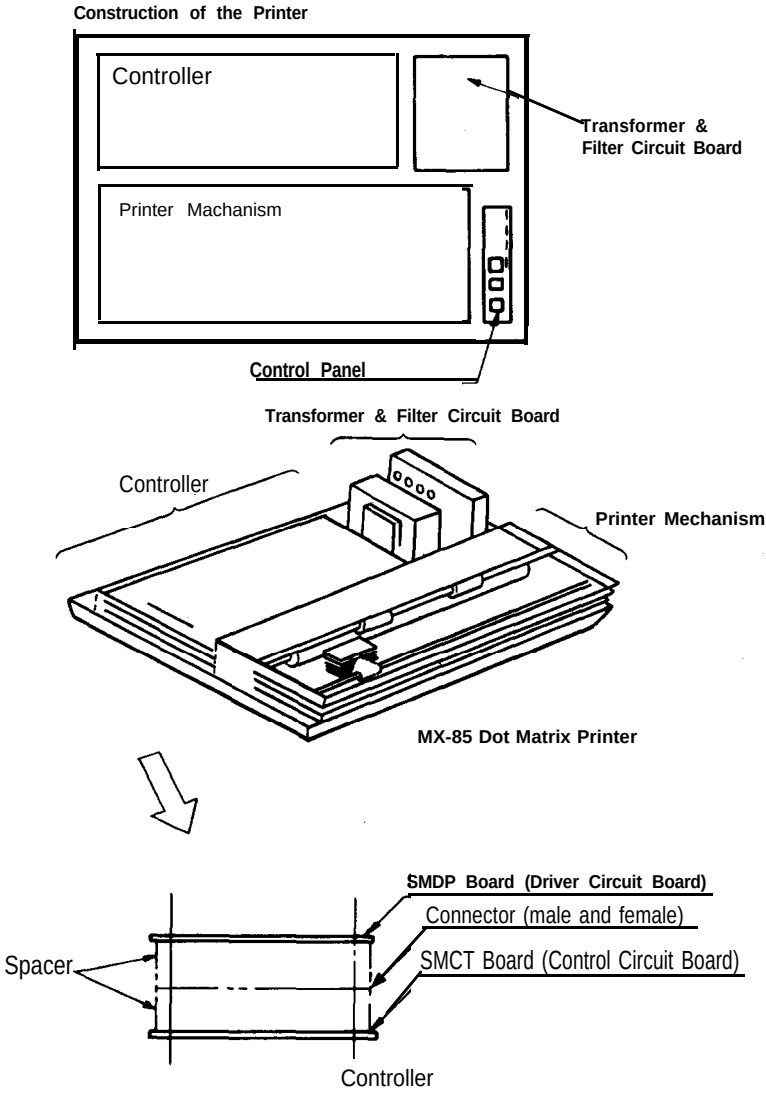


Fig. 8 Construction of the Printer

3. Setting of DIP Switches and Jumpers

3.1. Location of DIP switches and jumpers

In order to suit each user's specific requirements, there are two (2) DIP (Dual In-Line Pin) switches located on the SMDP Board and sixteen (16) jumpers located on the SMCT Board.

3.2. Setting DIP switches - SW-A and SW-B

1. With the top cover removed, observe the SMDP Board and locate the two switches. They are equipped with plastic dust covers which pull off. Remove them and set aside for later replacement. The switches set to the left are "ON" and to the right are "OFF".
2. Tables 1 and 2 outline the function of each switch position. Be sure power is off when changing the position of any switch.
   1) Switch B, the four (4) position switch, is used only to select correct baud rate.
   2) Switch A, the eight (8) position switch, is used for code selection, word size, parity control and line feed control.

The tables also note the factory-set conditions of both switches.

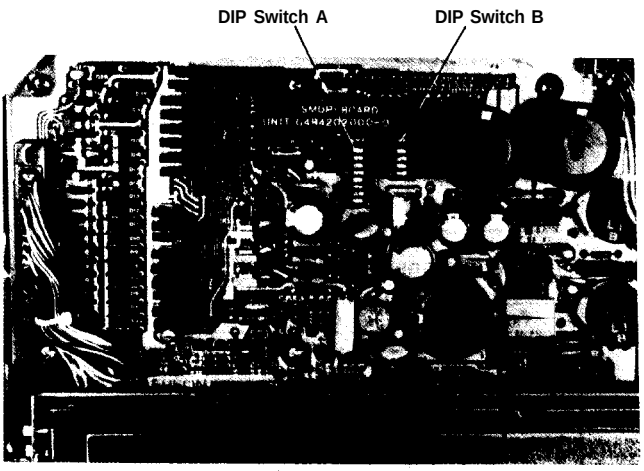


Fig. 9 Location of DIP Switches

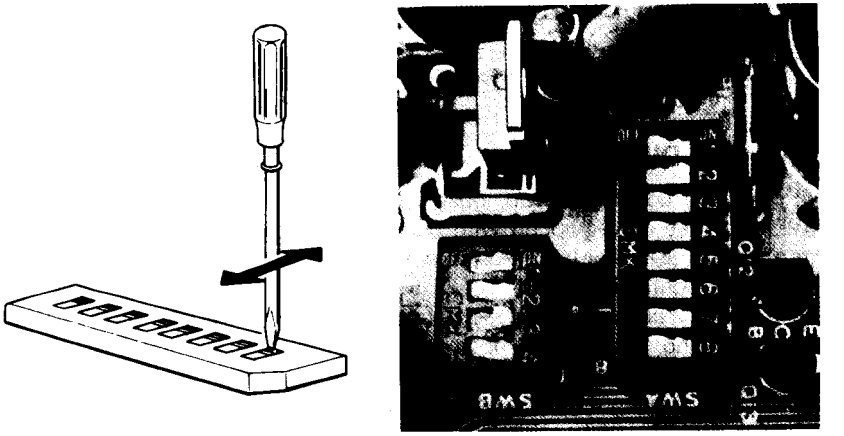


Fig. 10 Setting DIP Swtiches

Table 1 Functions and Conditions of DIP Switch B

Pin No.	Function	Off	On	Factory-set
B1	Baud Rate	See Table 3		ON
B2				OFF
B3				ON
B4				OFF

Table 2 Functions and Conditions of DIP Switch A

Pin No.	Function	Off	On	Factory-set
A1	Transmission Code	ASCII	BAUDOT	OFF
A2	In ASCII mode sets Word Structure	See Table 4		ON
A3				ON
A4	In Baudot mode sets Code Table	See Table 5		ON
A5	Line Spacing	1/3"	1/6"	ON
A6	AUTO FEED XT	Invalid	Valid	OFF
A7	Not used			OFF
A8				OFF

3. At this time, refer to Table 3 and set the baud rate to your requirements.

4. Now using Table 2, select your transmission code: ASCII or Baudot.
   A. If ASCII is selected, refer to Table 4 for word length setting and parity control.
   B. If Baudot is selected, refer to Table 5 for selection of correct Baudot code.
5. Set Line Spacing to desired position.
6. Set Auto Feed if required. This is necessary if the host system does not transmit line feed control code.

Details of the coding structures are contained in Appendix A for ASCII and Appendix B for Baudot.

Table 3 Baud Rate Selection

Pin No.	45.5	50	56.25 56.8	66.7	75	100	110	150	200	225	300	600	1200	2400	4800	9600
B1	1		1		1		1		1		1		1		1	
B2	1	1			1	1			1	1			1	1		
B3	1	1	1	1					1	1	1	1				
B4	1	1	1	1	1	1	1	1								

Note: 1 = ON

Table 4 ASCII Code Table Selection

Pin No.	Function	off	On	Factory-set
A2	Data Length	8 bit	7 bit	ON
A3	Parity Check	Enable	Disable	ON
A4	Parity	Even	Odd	ON

Table 5 BAUDOT Code Table Selection

SW A2	SW A3	SW A4	CODE TABLE
ON	ON	ON	CCITT #2
OFF	OFF	ON	CCIIT #2 AMERICAN
ON	OFF	ON	WU/TELEX

3.3. Setting of jumpers

Your application may require the removal or installation of jumpers of the SMCT Board. Before continuing, consult Table 6 which outlines the function and factory-set condition of each jumper.

In order to access the SMCT Board it is necessary to remove the SMDP Board. This is accomplished by:

1. Disconnecting the Mechanism Cable and the AC cable.

2. Removing the six (6) screws on the SMDP Board and the two (2) screws located in the heat sink on the right side of the board.

3. Lifting the Board from the rear center, in the connector area, to avoid damage.

NOTE:

Any changes in this area should be performed by an experienced technician.

Table 6 Function and Conditions of Jumpers

Jumper	Function					Factory-set
J1	Not used					OFF
J2	ON	RS-232C Level	OFF	Current Loop Level	Note 1	ON
J3	OFF		ON			OFF
J4	Both ON = Polar					OFF
J5	Both OFF = Neutral					OFF
J6	Not used					OFF
J7	Not used					OFF
J8	Current Loop (USA Version)					ON
J9	Both are ON when not using RTS and CTS					ON
J10						ON
J11	**ON when using CTS**					OFF
J12	**ON when using RTS**					**OFF**
J13	**80 mA Current Loop**					**OFF**
J14	**60 mA Current Loop**				Note 2	**OFF**
J15	**40 mA Current Loop**					OFF
J16	**20 mA Current Loop**					OFF

Note 1: Select either J2 or J3. Do not connect both.
Note 2: Select 1 only. Do not connect 2 or more.

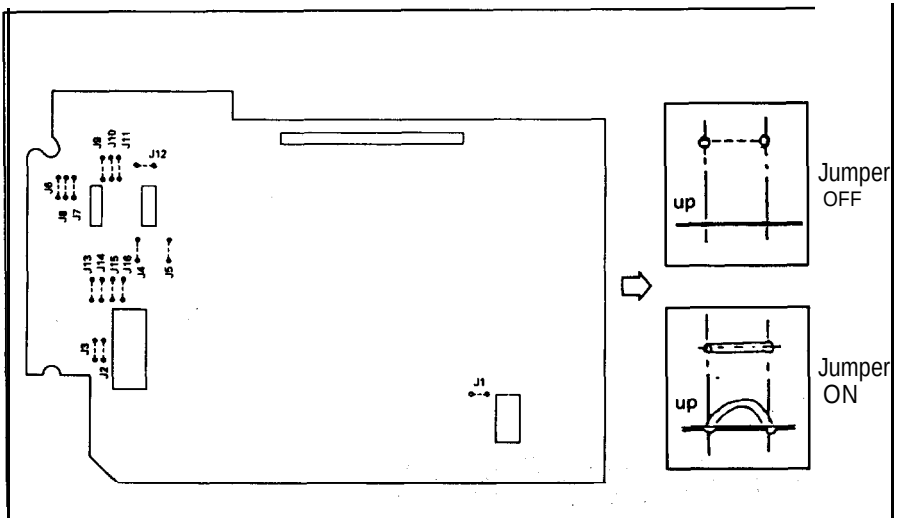


Fig. 11 Jumpers on the SMCT Board

4. Power Supply

Verify that the power supply is set correctly for your application. Check to see that the wire connected to the filter board is securely fastened to the correct voltage position. If it is necessary to change the voltage, use a flat blade screwdriver to loosen the existing connection and reconnect to the desired voltage. This change will necessitate a change in the filter circuit board, so your MX-85 supplier should be notified.

NOTE:

Any changes in this area should be performed by **an** *experienced technician.*

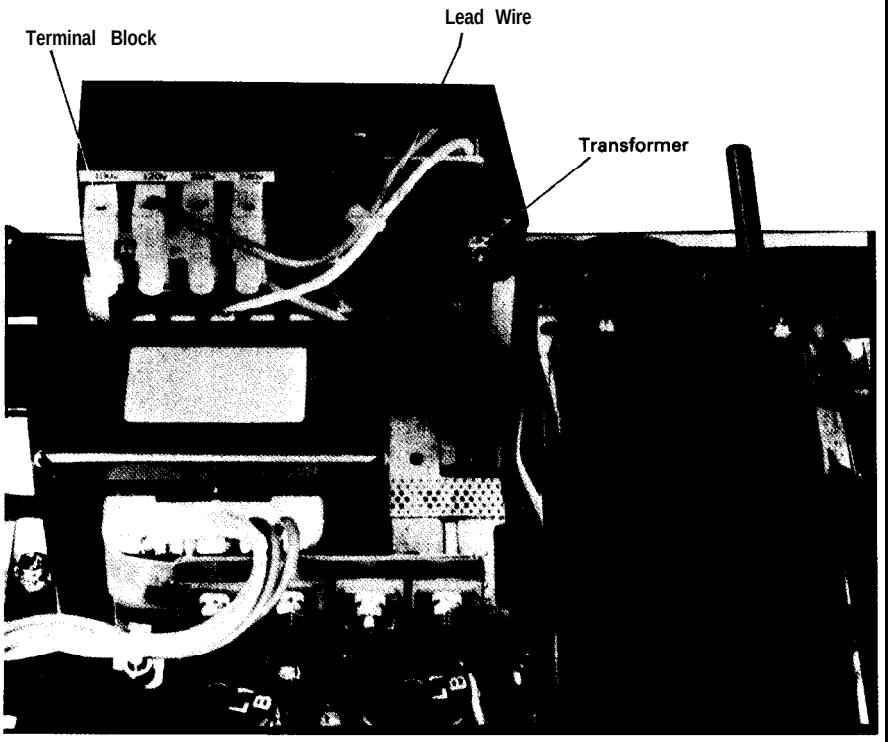


Fig. 12 Setting of Power Supply Voltage

5. Cartridge Ribbon Installation

1. Position the Printer with the logo facing you.
2. Lift the Printer cover.
3. Be sure the print scale is pushed to the rear, against the platen.
4. Remove the ribbon from its box and turn the knob counterclockwise to remove any slack.
5. Guide the four (4) tabs on the cartridge into the mechanism side frames.
6. Press down on both ends of the cartridge to firmly seat it.
7. Using a pencil or a similar item, place the ribbon between the front of the head and the ribbon guide.
8. Wind the ribbon counterclockwise and verify correct positioning.

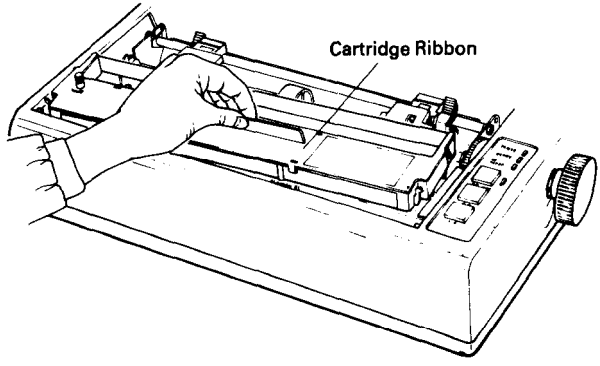


Fig. 13 Cartridge Ribbon Setting

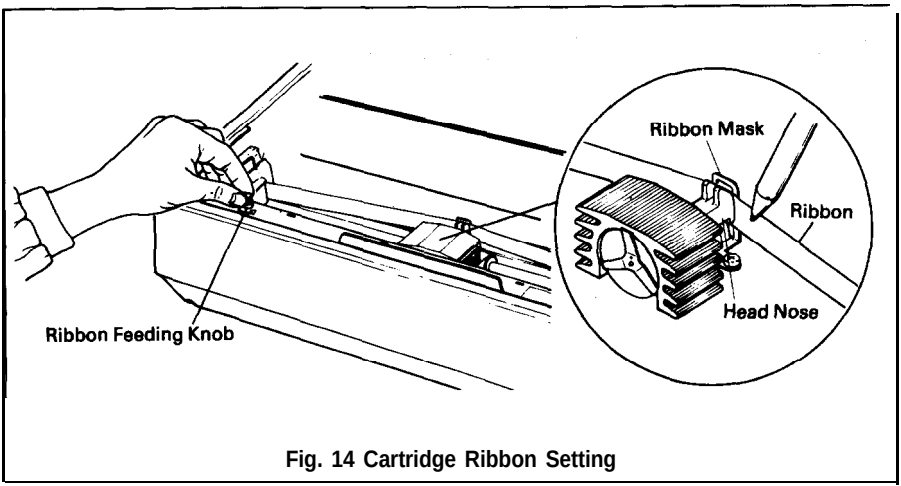


Fig. 14 Cartridge Ribbon Setting

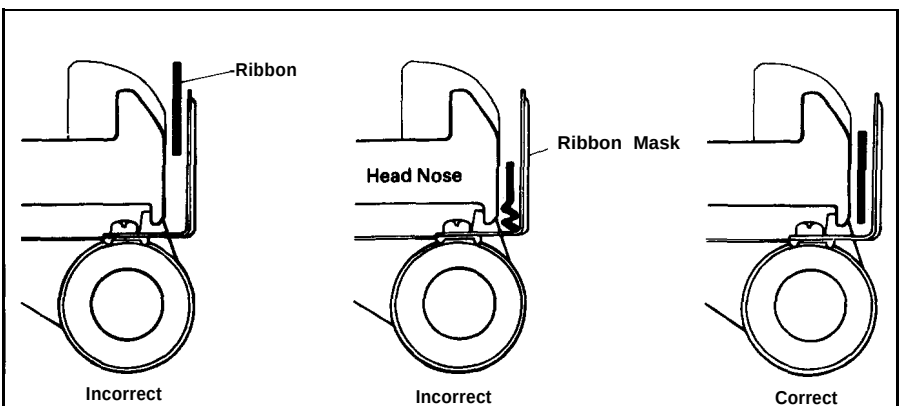


Fig. 15 Examples of Correct and Incorrect Ribbon Setting

6. Paper Holder Installation

The following steps should be performed with the power off.

1. Set the paper holder behind the MX-85 and locate the rear rubber feet of the Printer in the forward holes of the paper holder. Failure to do this will result in severe paper-tracking problems.

2. Plug jack type connector, which is connected to the "Low Paper" sensor, into the mating connector located alongside of the 25-pin EIA connector on the rear of the MX-85.
3. Lift the printer cover and slide the print head to approximately the center of the printer.
4. Pull the print scale forward and push the paper release to the rear.
5. Mount the roil paper onto the paper holder.
6. Insert the paper into the slot at the rear of the platen on the MX-85.
7. Turn the black knob on the right side of the printer to feed the paper through.
8. Pull the paper release forward and align the paper.
9. Restore the paper release lever to the rear and the print scale to the rear. Position the plastic tubes on the print scale to retain the paper firmly.
10. Close the printer cover.

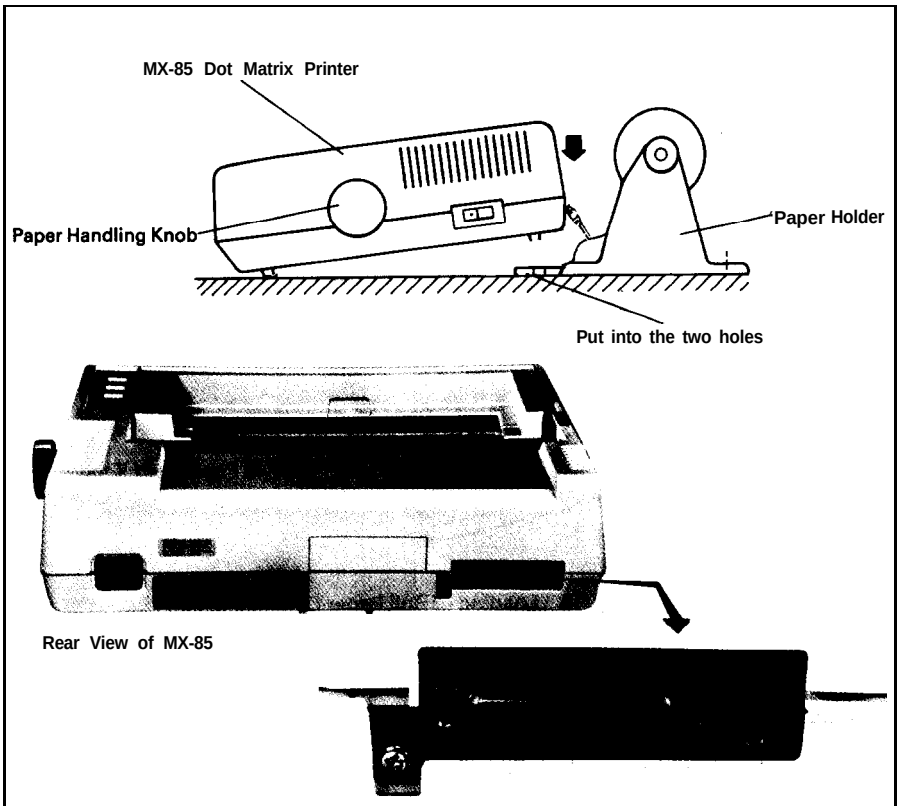


Fig. 16 Loading of Roll Paper (1)

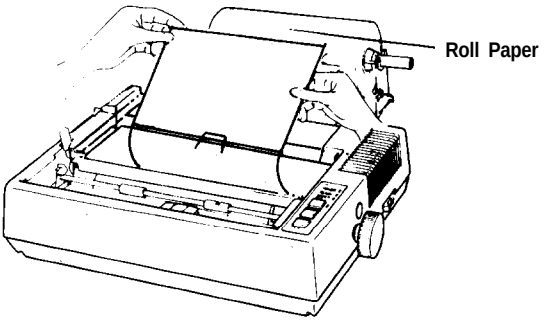


Fig. 17 Loading of Rool Paper (2)

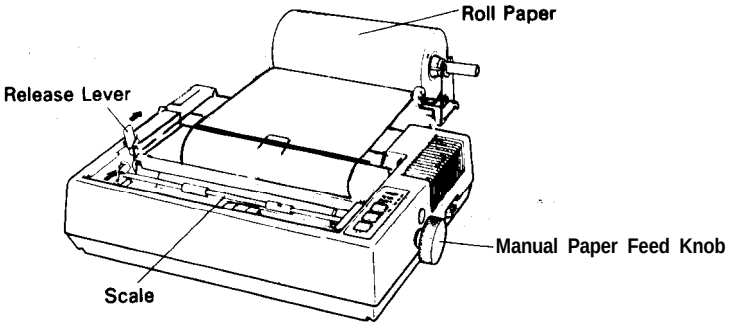


Fig. 18 Loading of Roll Paper (3)

7. Gap Adjustment

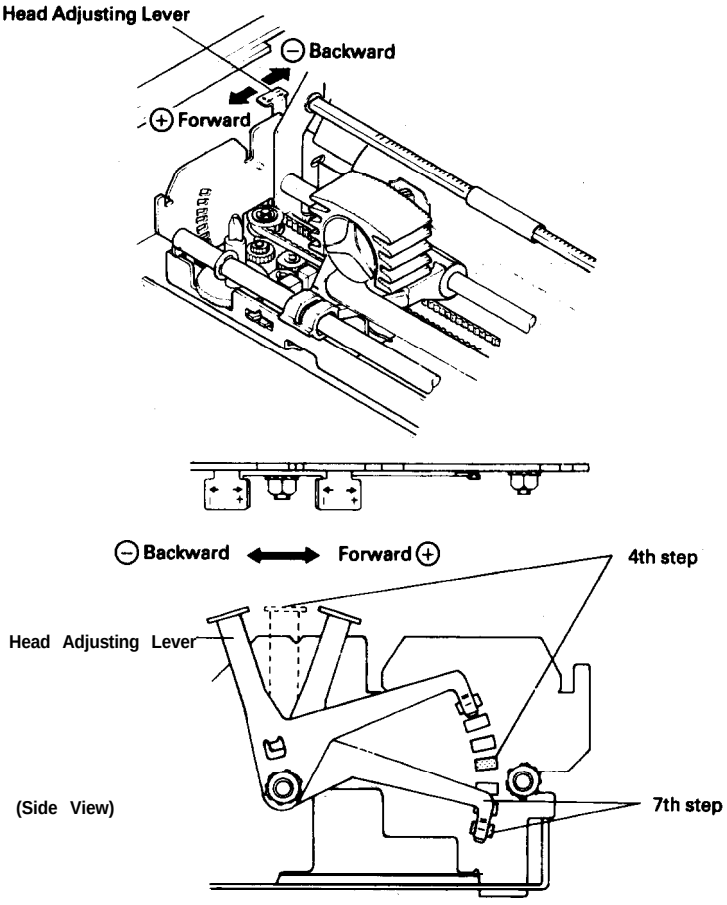
It is possible to adjust the gap between the print head and platen to accommodate various thicknesses of form and print density.

The head adjusting lever is located on the left side frame of the print mechanism.

Move forward to widen gap.

Move rearward to narrow gap.

This lever can also be used to compensate for decreased print density due to ribbon wear after extended usage.



Paper	Position of adjusting lever
Single-leaf paper	Set the lever to the 4th step.
Multi-copy paper sheets	Set the lever to the 7th step.

Fig. 19 Gap Adjustment

OPERATION

Power On

1. Plug in AC power cord.

2. Turn on the Printer - switch located to the rear on the right side of the Printer.

1) Buzzer will sound.

2) Print head will return to the left side of the Printer.

3) **The "Power", "Ready" and "On-Line" indicators should be lit on the control panel. "Paper-Out" indicator will be off.**

1. LF/FF Functions

1. Depress the Line Feed (LF) button. Paper will be fed one line at a time while the switch is held depressed.

2. Depress the Form Feed (FF) button. Paper will be fed either 10 lines (l/S" spacing) or 5 lines (1/3" spacing). This is preset by the position of DIP Switch A-5. Depression of this switch will position the last line printed above the tear-off blade.

NOTE:

Both of these switches will function while On-line. If used while a message is being received, printing will be interrupted **and** *the LF or FF function will be performed.* **Normal** *printing will resume automatically.*

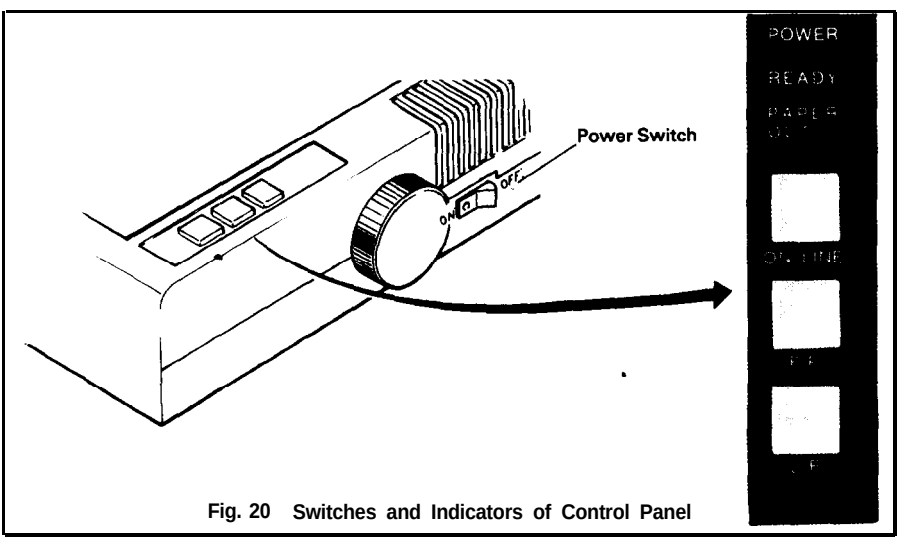


Fig. 20 Switches and Indicators of Control Panel

2. Self -Test

The MX-85 has a self-test routine programmed into the Controller. It is useful to check the operation of the print head and the print mechanism (ribbon, motors, belt, etc.). The input connector is not checked with this test.

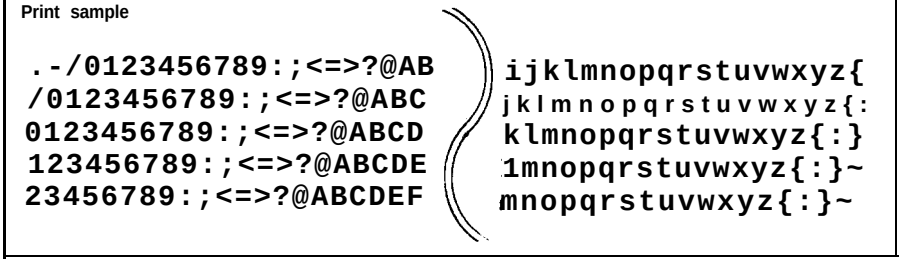
1. **Be sure there is an adequate supply of paper in the Printer. The test requires about 22 inches.**
2. **Turn'off power.**
3. **Turn on power while holding the LF button depressed.**
4. **The MX-85 will begin printing its test pattern. The LF button can be released after printing commences.**

   NOTE:

   See Appendix C for Character Fonts.

If any problems are encountered at this point, contact your vendor for correction before proceeding.

Print sample



3. On-Line Operation

Connection to your host system is through the 25-pin EIA connector located on the left rear of the MX-85. The pin assignments are noted in Table 8. It is recommended that all interface cables be as short as possible to minimize noise injection.

Table 7 25-pin EIA Connector

Pin No.	Signal Name	
1	Chassis Ground	
2	TXD	
3	RXD	
4	RTS	
5	CTS	
7	Signal Ground	
11	Reverse Channel (REV)	
20	Data Term Rdy (DTR)	
23	TTY-RXD Return	Current
25	TTY-RXD	Loop Input

4. Theory of Operation

The data received by the MX-85 is stored in the 4K Byte Memory. Printing is initiated by the following means:

1. Receipt of the Carriage Return (CR) or Line Feed (LF) Control codes.
2. An excess of 80 characters (1 line) in the print buffer.
3. A transmission gap in excess of two (2) seconds, provided there are printable characters stored in the buffer.

The MX-85 will continue to receive data and store it in the buffer memory while printing.

There are some conditions which will interfere with the ability of the MX-85 to receive and/or print data. These are:

1. Paper Low
2. Paper Empty
3. 4K Memory Full

4.1. Low paper

The low paper sensor is mounted on the paper holder. It is activated when approximately 7 meters (22') of paper is remaining. This should be adequate to print any message being transmitted at the time of activation. When the sensor is activated, the following conditions will take place:

Status - DTR pin 20 Mark (-V)
Data Entry - Available until buffer full
Indicators - "Paper Out" ON
"Ready" OFF
Buzzer - Sounds for 20 seconds
Printing - Unaffected

NOTE:
Buzzer will stop upon depression of LF or FF button.

4.2. Paper empty

The paper empty switch located beneath the platen will activate when the paper runs out. When activated, the following conditions will take place:

Status - DTR pin 20 = Mark (-V)
Rev Chan pin 11 = Mark (-V)
Data Entry - Available until buffer full
Indicators - "Paper Out" ON
"Ready" OFF
Buzzer - Sounds for 20 seconds
Printing - Disabled

NOTE:
Buzzer will stop upon depression of LF or FF button.

Both the paper empty and the low paper conditions call for replacement of the paper roll. This should be done with the power on to avoid losing any data. Upon completion of paper loading, the "On-Line" button should be depressed. This will activate printing if there are any printable characters stored in the memory. The "Paper-Out" indicator w&be extinguished and the "Ready" indicator illuminated if the MX-85 is not in a memory full condition.

4.3. 4K memory full

When the buffer memory reaches 3,996 bytes, the following conditions will take place:

Status - DTR pin 20 = Mark (-V)
Rev Chan pin 11 = Mark (-V)
Data Entry - Disabled
Indicators - "Ready" OFF
Printing - Enabled

As soon as 1 K bytes of memory is made available, all of the above conditions will revert to normal.

5. Paper Tear-Off

1. To tear off the last message printed, depress the FF button to position the paper.
2. Hold down the printer cover while tearing the paper.
3. Check to see that the paper is against the platen and that the paper has not shifted. Reposition if necessary.

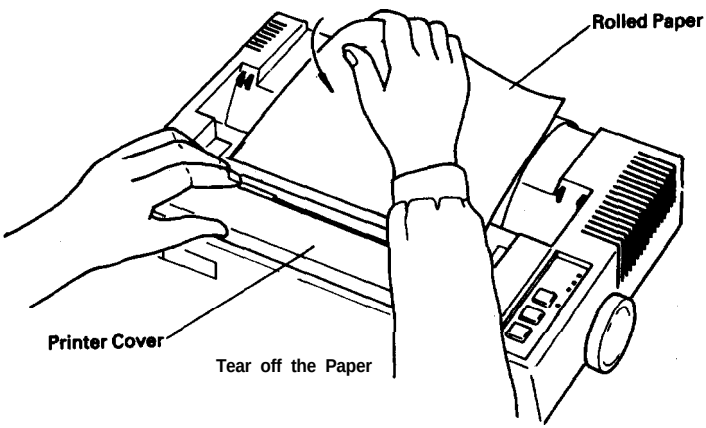


Fig. 21 Cutting Paper

MAINTENANCE AND PARTS REPLACEMENT

Preventative Maintenance of the MX-85 consists mainly of cleaning.

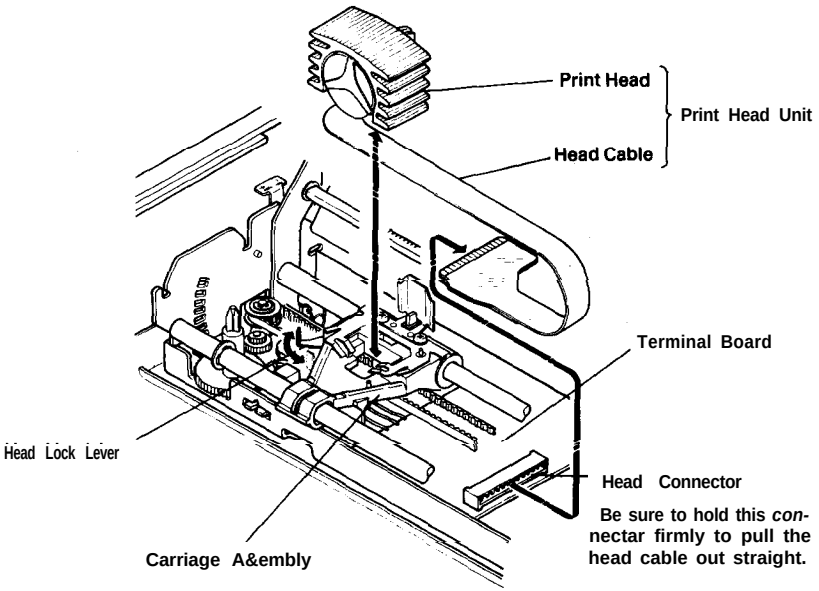
1. **Paper dust and particles should be cleared away with a soft brush.**
2. **The exterior of the Printer can be cleaned with a mild detergent and water solution.**
3. **The interior of the Printer can be cleaned with denatured alcohol.**

The only user replaceable items are the cartridge ribbon and the print head. Cartridge ribbon replacement is covered in a previous section of this manual.

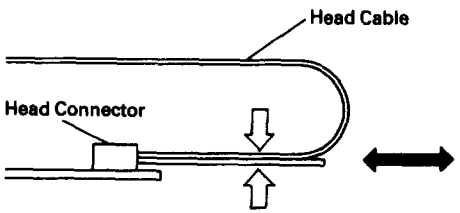
Print Head replacement

CAUTION:
The print head runs very hot under normal operating conditions. Allow time for it to cool before attempting replacement.

1. **Remove the printer cover and cartridge ribbon.**
2. **Turn the head locking lever clockwise and lift the print head straight up.**
3. **Disconnect the cable carefully by pulling the plastic tab under the cable while holding the terminal board.**
4. **Install the new print head onto the carriage assembly and turn the head locking lever counterclockwise.**
5. **Carefully install the head cable into the connector assembly.**
6. **Replace the cartridge ribbon and printer cover.**
7. **Run Self-Test.**



(Side View)



*Take hold of the cable at the point indicated by arrows ⇳ and apply force in either of the directions indicated by arrow ⟷ to push in or pull out the head cable.

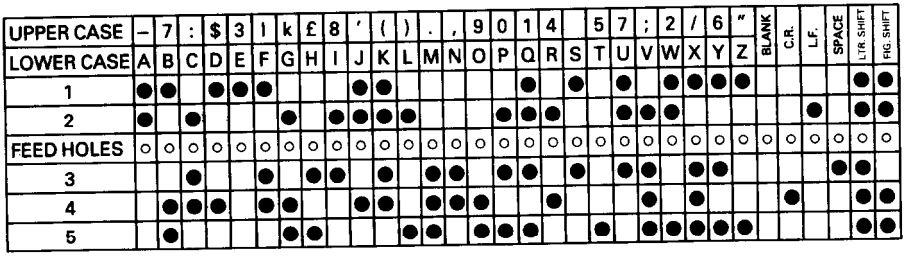
Fig. 22 Replacement of Print Head

Appendix A ASCII Code Table

BITS b7 → b6 → b5 →					0 0 0	0 0 1	0 1 0	0 1 1	1 0 0	1 0 1	1 1 0	1 1 1
b4	b3	b2	b1	Hex.	0	1	2	3	4	5	6	7
0	0	0	0	0			SP	0	@	P	'	p
0	0	0	1	1			!	1	A	Q	a	q
0	0	1	0	2			"	2	B	R	b	r
0	0	1	1	3			#	3	C	S	c	s
0	1	0	0	4			$	4	D	T	d	t
0	1	0	1	5			%	5	E	U	e	u
0	1	1	0	6			&	6	F	V	f	v
0	1	1	1	7			'	7	G	W	g	w
1	0	0	0	8			(	8	H	X	h	x
1	0	0	1	9			)	9	I	Y	i	y
1	0	1	0	A	LF		*	:	J	Z	j	z
1	0	1	1	B			+	;	K	[	k	{
1	1	0	0	C			,	<	L	\	l	¦
1	1	0	1	D	CR		-	=	M	]	m	}
1	1	1	0	E			.	>	N	↑	n	~
1	1	1	1	F			/	?	O	—	o	●

b_1 (low order bit) is normally transmitted first.

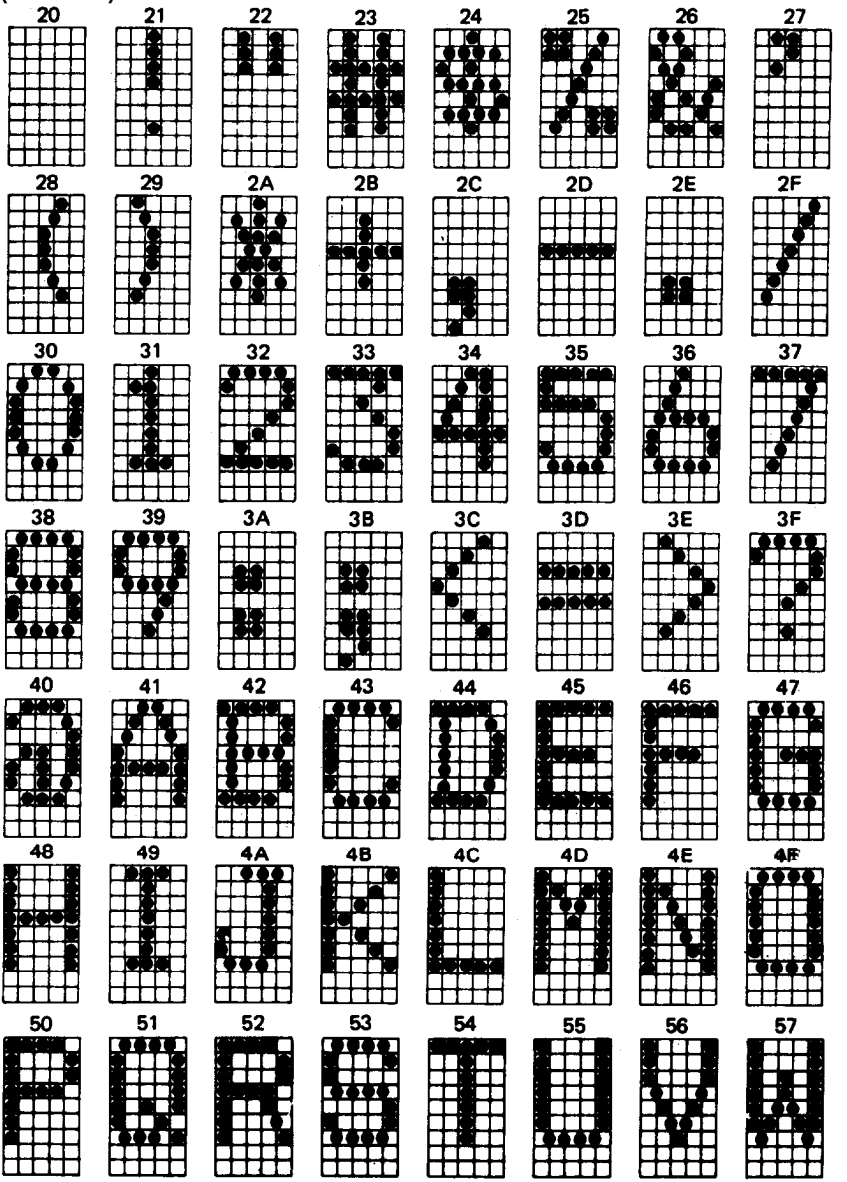
Appendix B Baudot Code Table



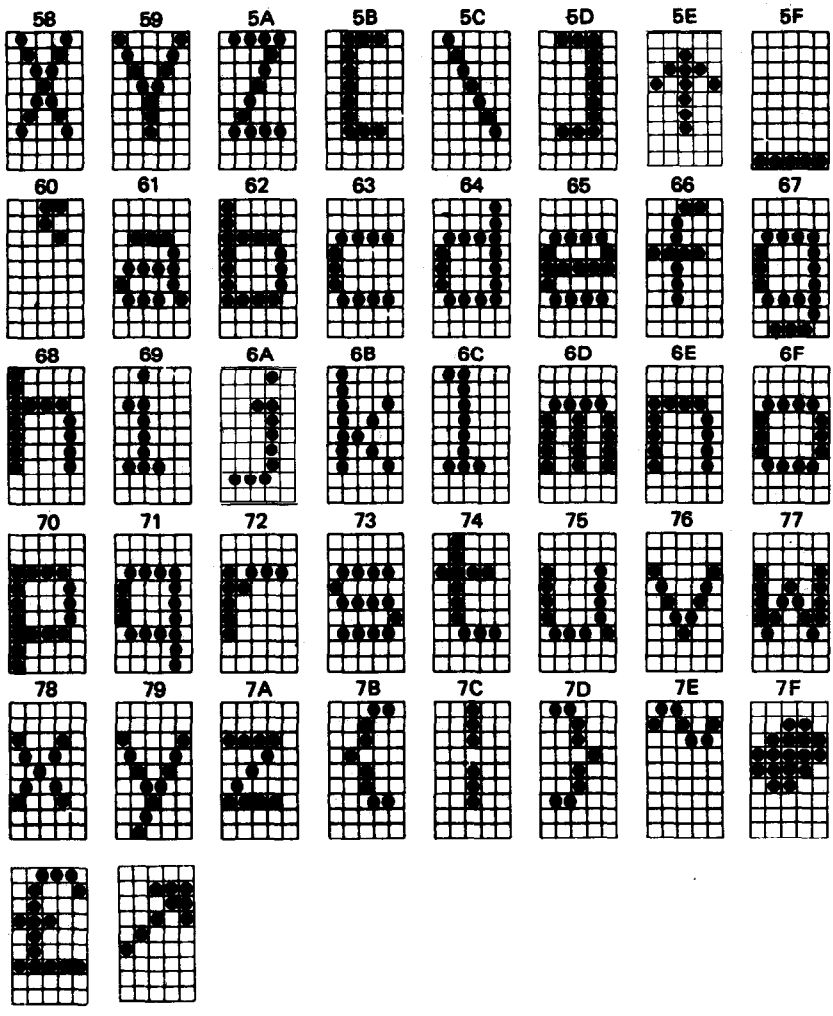
Data code (Notation)		Shift (Letter)	Shift (Figure and Symbol)		
Hex code	Oct. code		CCITT #2	CCITT #2 American	WU Telex
00	00	Blank	Blank	Blank	Blank
01	01	E	3	3	3
02	02	LF	LF	LF	LF
03	03	A	–	–	–
04	04	Space	Space	Space	Space
05	05	S	'	BELL	'
06	06	I	8	8	8
07	07	U	7	7	7
08	10	CR	CR	CR	CR
09	11	D	Space	$	↑
0A	12	R	4	4	4
0B	13	J	BELL	'	BELL
0C	14	N	,	,	,
0D	15	F	Space	!	$
0E	16	C	:	:	:
0F	17	K	(	(	(
10	20	T	5	5	5
11	21	Z	+	"	"
12	22	L	)	)	)
13	23	W	2	2	2
14	24	H	Space	£	#
15	25	Y	6	6	6
16	26	P	0	0	0
17	27	Q	1	1	1
18	30	O	9	9	0
19	31	B	?	?	?
1A	32	G	Space	&	&
1B	33	FIGS.	FIGS.	FIGS.	FIGS
1C	34	M	.	.	.
1D	35	X	/	/	/
1E	36	V	=	;	;
1F	37	LTRS.	LTRS.	LTRS.	LTRS

Appendix C Character Fonts

(Hex. Code)



NOTE: Numbers represent Hex.



NOTE: Numbers represent Hex. Code.

FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE
STATEMENT

"This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and tele vision reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifi cations in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residen tial installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

. . . .reorient the receiving antenna
. . . . . .relocate the computer with respect to the receiver
. . . .move the computer away from the receiver
. . . .plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions.
The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems. "
This booklet is available from the US Government Printing Office, Washington, D.C., 20402, Stock No. 004-000-00345-4."

This statement will be applied only for the printers marketed in the U.S.A.